Wide band instantaneous coverage receiver concept for ALMA

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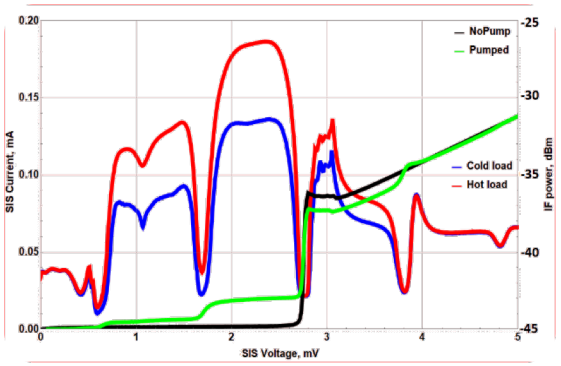
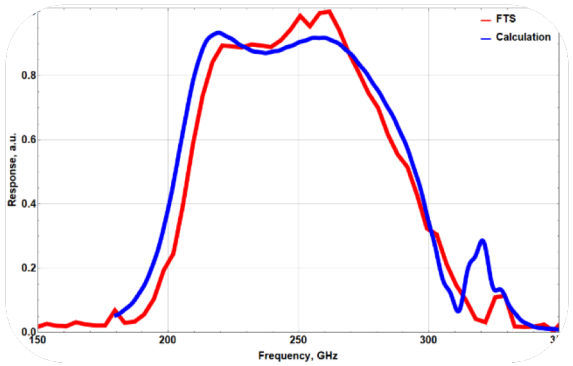
Improve ALMA!

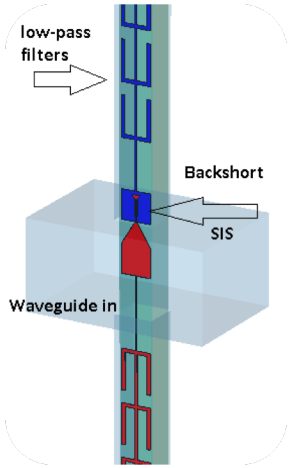
How can we improve current ALMA system

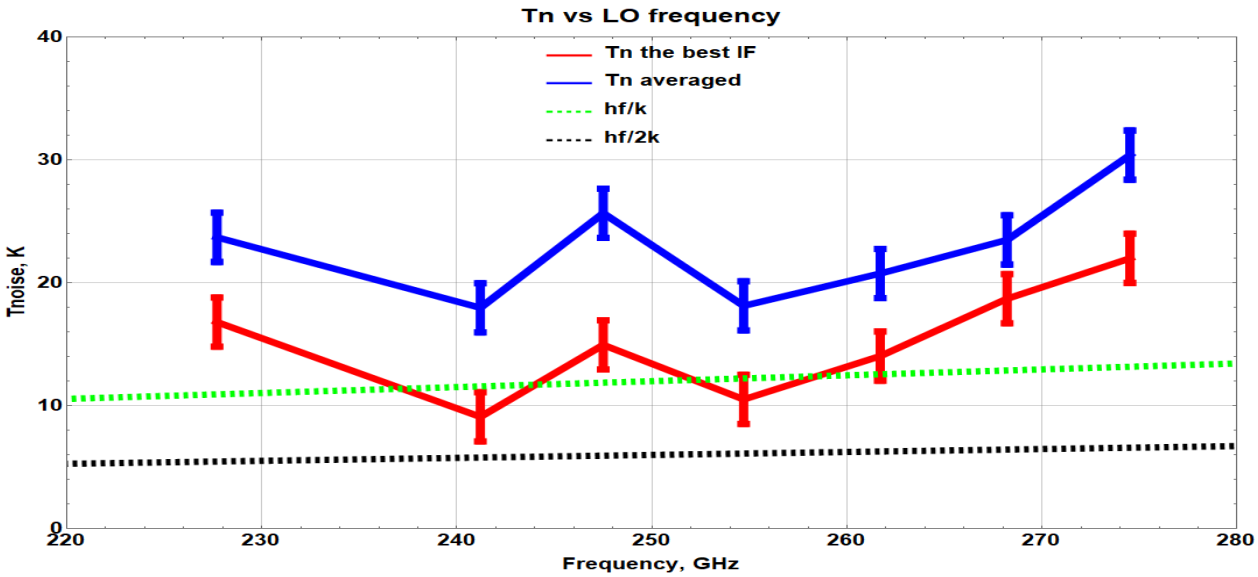
- Improve sensitivity of SIS mixer (Quantum limited performance @ 260 GHz)
- Improve instantaneous RF bandwidth (dual frequency operation = 1st step)
- Ultra wide instantaneous coverage
  = **ultimate receiver** for ALMA

Attacking quantum limit hf/(2k)





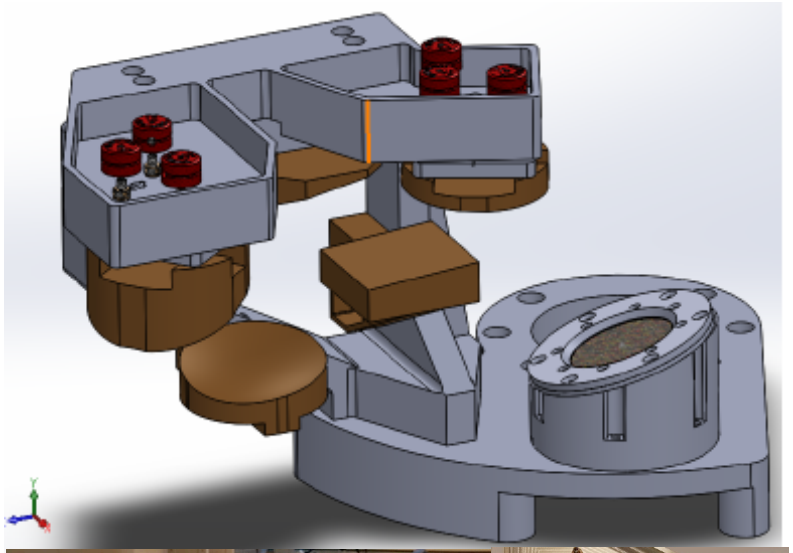


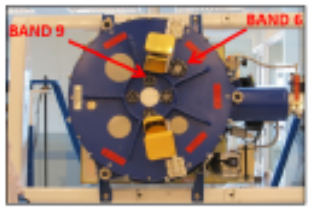


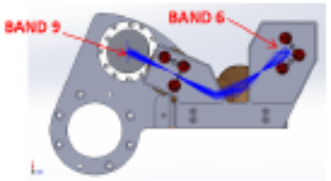
Dual frequency ALMA B6/9

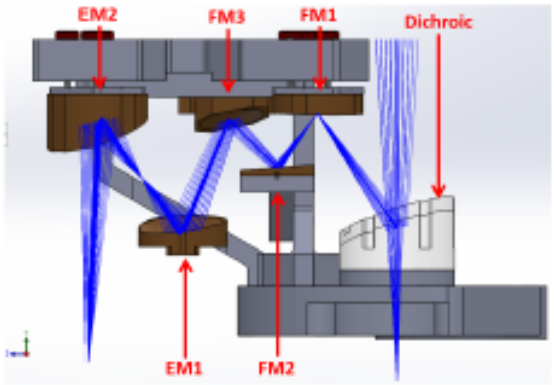
Benefits:

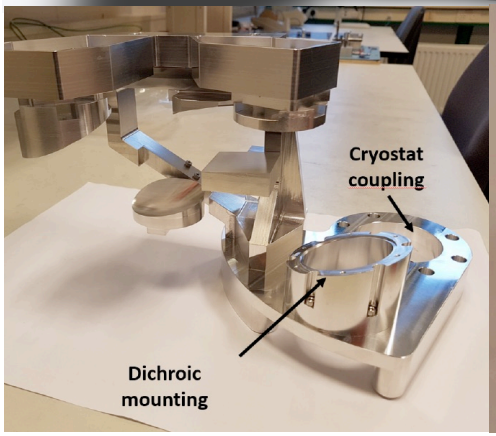
- Improved phase calibration
- Enabling the highest resolution imaging with ALMA
- Observation of transient phenomena
- High redshift resolved cosmic star formation history
- **No changes in ALMA system**

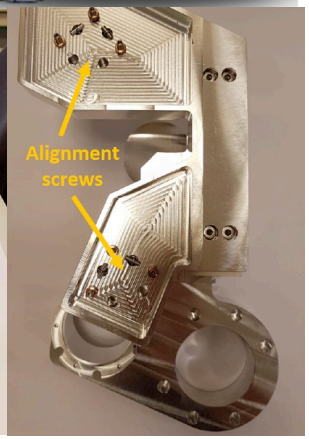




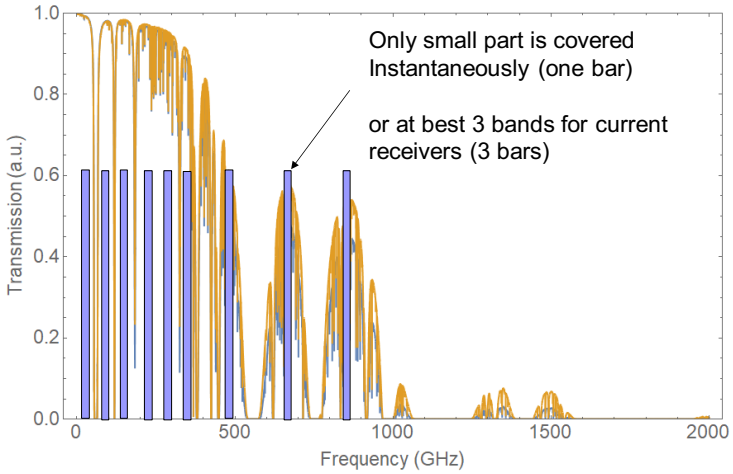


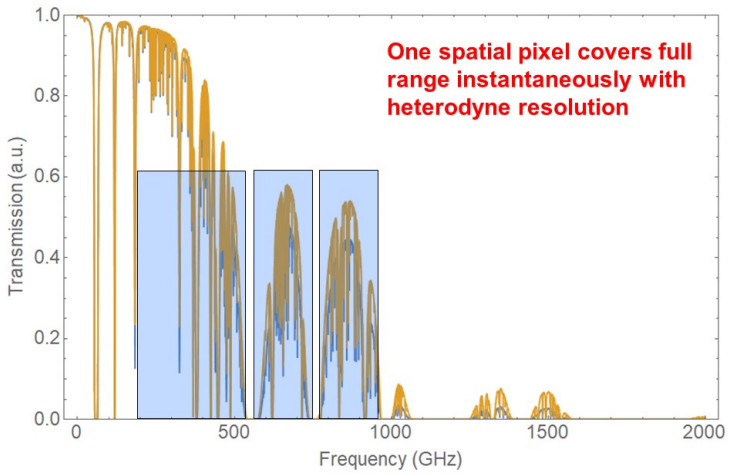


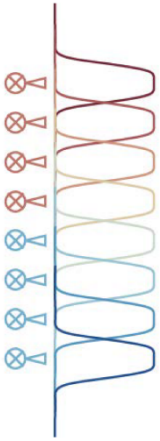


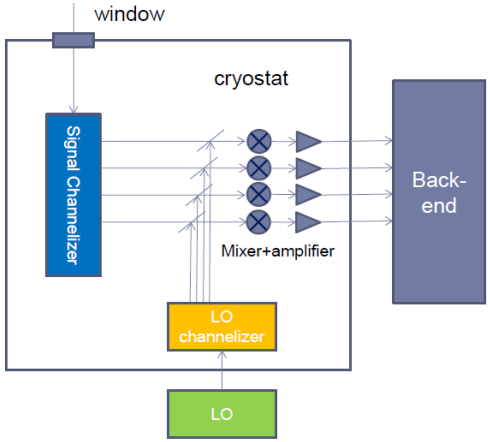


Frequency Array Receiver

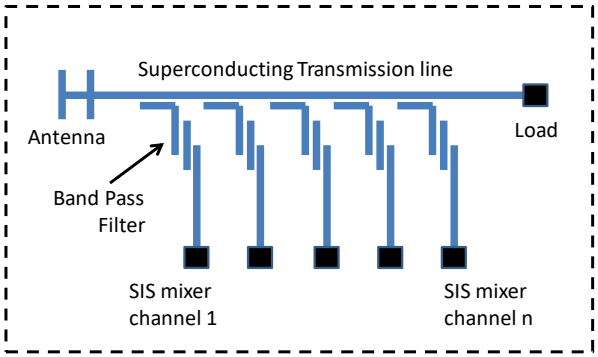








Quasi-optical system



An on-chip system

Key advantages

- All atomic/molecular lines are available in one go in high resolution
- Much more information is available for atmospheric transmission correction
- Possibility to study large spectral features (dust)
- Possibility to exclude atmospheric line forest – background limited total power performance
- Blind red shifted CII, CO, CI search (SUPERSPEC, DESHIMA science)
- Ultimate ALMA/ATLAST front-end backend